

CLAIMS:

- 1) A method of determining an orientation of a respective object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions provided at respective positions on the interface surface, each coded data portion being indicative of an identity of the object, and wherein the method includes, in a sensing device:
 - (a) sensing at least one coded data portion;
 - (b) generating, using the sensed coded data portion, indicating data indicative of the object identity and at least one of:
 - (i) a position of the sensed coded data portion;
 - (ii) a position of the sensing device relative to the interface surface;
 - (iii) an orientation of the sensed coded data; and,
 - (iv) an orientation of the sensing device relative to the interface surface; and,
 - (c) transferring the indicating data to a computer system, the computer system being responsive to the indicating data to determine the orientation of the object.
- 2) The method of claim 1, wherein the method includes, in the computer system:
 - (a) receiving the indicating data;
 - (b) determining from the received indicating data:
 - (i) object identity data indicative of the identity of the object;
 - (ii) position data indicative of at least one of:
 - (1) the position of the sensed coded data portion;
 - (2) the position of the sensing device relative to the interface surface;
 - (3) the orientation of the sensed coded data; and,
 - (4) the orientation of the sensing device relative to the interface surface; and,
 - (c) determining, using the object identity data and the position data, the orientation of the object.
- 3) The method of claim 2, wherein the method includes, in the computer system:
 - (a) determining, using the object identity data, a description of the interface surface; and,
 - (b) determining, using the description and the position data, the orientation of the object.
- 4) The method of claim 1, wherein the object includes a number of faces, and wherein the method includes, in the sensing device:
 - (a) sensing the coded data provided on one face; and,
 - (b) generating, using the sensed coded data, indicating data indicative of the at least one face.
- 5) The method of claim 1, wherein the coded data includes target features, and wherein the method includes in the sensing device:
 - (a) sensing at least one target feature; and,

- (b) generating, using the sensed target feature, indicating data indicative of the perspective of the coded data relative to the sensing device.
- 6) The method of claim 5, wherein the coded data is arranged in accordance with a plurality of layouts, each layout including at least one target feature.
- 5 7) The method of claim 6, wherein at least some target features being common to at least two layouts.
- 8) The method of claim 7, wherein the method includes, in the sensing device:
 - (a) sensing at least one target feature; and,
 - (b) generating, using the sensed target feature, indicating data indicative of at least one of:
 - 10 (i) the position of the sensing device with respect to the interface surface;
 - (ii) the position of the sensed coded data;
 - (iii) the orientation of the sensed coded data; and,
 - (iv) the orientation of the sensing device relative to the interface surface.
- 9) The method of claim 1, wherein the coded data includes orientation features, and wherein
 - 15 method includes in the sensing device:
 - (a) sensing at least one orientation feature; and,
 - (b) generating, using the orientation feature, indicating data indicative of an orientation of the sensing device relative to the target feature.
- 10) The method of claim 9, wherein the at least one orientation feature is rotationally asymmetric.
- 20 11) The method of claim 10, wherein the at least one orientation feature is skewed along its major axis.
- 12) The method of claim 1, wherein the method includes providing the object in a sensing region to thereby sense the coded data.
- 13) The method of claim 1, wherein the sensing device is arranged at a predetermined orientation
 - 25 with respect to the sensing region, and wherein the method includes in the computer system determining, using the indicating data and the predetermined orientation, the orientation of the object.
- 14) A method of determining an orientation of a respective object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a
 - 30 plurality of coded data portions provided at respective positions on the interface surface, each coded data portion being indicative of an identity of the object, and wherein the method includes, in a sensing device:
 - (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the object
 - 35 and at least one of:
 - (i) a position of the sensing device with respect to the interface surface;

- (ii) a position of the sensed coded data;
 - (iii) an orientation of the sensed coded data; and,
 - (iv) an orientation of the sensing device relative to the interface surface.
- (b) generating, using the received indicating data:
 - 5 (i) identity data indicative of the object identity; and,
 - (ii) position data indicative of at least one of:
 - (1) the position of the sensed coded data portion; and,
 - (2) a position of the sensing device relative to the interface surface; and,
 - (c) determining, using the identity data and the position data, orientation of the object.
- 10 15) The method of claim 14, wherein the method includes, in the computer system:
 - (a) determining, using the object identity data, a description of the interface surface; and,
 - (b) determining, using the description and the position data, the orientation of the object.
- 15 16) The method of claim 15, wherein the object includes a number of faces, and wherein the sensing device generates, using the sensed coded data, indicating data indicative of one of the faces, and wherein the method includes in the computer system:
 - (a) generating, using the received indicating data, face data indicative of the face; and,
 - (b) determining, using the face data, the orientation of the object.
- 20 17) The method of claim 14, wherein the coded data includes target features, and wherein the sensing device generates, using a sensed target feature, indicating data indicative of the perspective of the coded data relative to the sensing device, and wherein the method includes, in the computer system:
 - (a) generating, using the received indicating data, perspective data indicative of the perspective of the coded data relative to the sensing device; and,
 - (b) determining, using the perspective data, the orientation of the object.
- 25 18) The method of claim 17, wherein the coded data is arranged in accordance with a plurality of layouts, each layout including at least one target feature.
- 19) The method of claim 18, wherein at least some target features being common to at least two layouts.
- 30 20) The method of claim 14, wherein the coded data includes orientation features, wherein the sensing device generates, using a sensed target feature, indicating data indicative of the orientation of the sensing device relative to the coded data, and wherein the method includes, in the computer system:
 - (a) generating, using the received indicating data, orientation data indicative of the orientation of the sensing device relative to the coded data; and,
 - 35 (b) determining, using the orientation data, the orientation of the object.
- 21) The method of claim 20, wherein the at least one orientation feature is rotationally asymmetric.

- 22) The method of claim 21, wherein the at least one orientation feature is skewed along its major axis.
- 23) A method of determining an orientation of a respective object, the object having an interface surface having coded data disposed thereon or therein, wherein the interface surface includes at least one region having at least one coded data portion provided therein, the at least one coded data portion being indicative of an identity of the region, and wherein the method includes, in a sensing device:
- (a) sensing at least one coded data portion;
 - (b) generating, using the sensed coded data portion, indicating data indicative of the region identity; and,
 - (c) transferring the indicating data to a computer system, the computer system being responsive to the indicating data to determine the orientation of the object.
- 24) The method of claim 23, wherein the method includes, in the computer system:
- (a) receiving indicating data from the sensing device; and,
 - (b) determining from the received indicating data, region identity data indicative of the identity of the region;
 - (c) determining, using the region identity data, the orientation of the object.
- 25) The method of claim 24, wherein the method includes, in the computer system:
- (a) determining, using the region identity data, a description of the interface surface; and,
 - (b) determining, using the description, the orientation of the object.
- 26) The method of claim 23, wherein the object includes a number of faces, and wherein the method includes, in the sensing device:
- (a) sensing the coded data provided on one face; and,
 - (b) generating, using the sensed coded data, indicating data indicative of the at least one face.
- 27) The method of claim 23, wherein the object includes a number of faces, and wherein each face includes at least one region.
- 28) The method of claim 23, wherein the coded data includes target features, and wherein method includes, in the sensing device:
- (a) sensing at least one target feature; and,
 - (b) generating, using the sensed target feature, indicating data indicative of the perspective of the coded data relative to the sensing device.
- 29) The method of claim 23, wherein the coded data includes orientation features, and wherein method includes, in the sensing device:
- (a) sensing at least one orientation feature; and,
 - (b) generating, using the orientation feature, indicating data indicative of an orientation of the sensing device relative to the target feature.

- 30) The method of claim 29, wherein the at least one orientation feature is rotationally asymmetric.
- 31) The method of claim 30, wherein the at least one orientation feature is skewed along its major axis.
- 32) A method of determining the orientation of a respective object, the object having an interface surface having coded data disposed thereon or therein, wherein the interface surface includes at least one region having at least one coded data portion provided therein, the at least one coded data portion being indicative of an identity of the region, and wherein the method includes, in a computer system:
- (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the region;
- (b) determining, using the indicating data, region identity data indicative of the identity of the region; and,
- (c) determining, using the region identity data, the orientation of the object.
- 33) The method of claim 32, wherein the method includes, in the computer system:
- (a) determining, using the region identity data, a description of the interface surface; and,
- (b) determining, using the description, the orientation of the object.
- 34) The method of claim 32, wherein the object includes a number of faces, wherein sensing device generates, using the sensed coded data, indicating data indicative of the at least one face, and wherein the method includes, in the computer system:
- (a) determining, using the indicating data, face data indicative of the respective face; and,
- (b) determining the orientation using the face data.
- 35) The method of claim 32, wherein the coded data includes target features, wherein sensing device generates, using a sensed target feature, indicating data indicative of the at indicating data indicative of the perspective of the coded data relative to the sensing device, and wherein the method includes, in the computer system:
- (a) determining, using the indicating data, perspective data indicative of the perspective of the coded data relative to the sensing device; and,
- (b) determining the orientation using the perspective data.
- 36) The method of claim 32, wherein the coded data includes target features, wherein sensing device generates, using a sensed target feature, indicating data indicative of the at indicating data indicative of the orientation of the sensing device relative to the coded data, and wherein the method includes, in the computer system:
- (a) determining, using the indicating data, orientation data indicative of the orientation of the sensing device relative to the sensed coded data; and,
- (b) determining the orientation using the orientation data.
- 37) The method of claim 36, wherein the at least one orientation feature is rotationally asymmetric.

- 38) The method of claim 37, wherein the at least one orientation feature is skewed along its major axis.
- 39) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is substantially invisible to the unaided eye.
- 5 40) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is printed using infrared ink.
- 41) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is indicative of an EPC associated with the object.
- 42) The method of any one of claims 1, 14, 23 and 32, wherein the coded data distinguishes the
10 object from every other object.
- 43) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is redundantly encoded.
- 44) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is redundantly encoded using Reed-Solomon encoding.
- 15 45) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is provided on the interface surface coincident with visible markings representing at least one of:
- (a) object information;
 - (b) orientation information;
 - (c) the identity of the object; and,
 - 20 (d) object status information.
- 46) The method of any one of claims 1, 14, 23 and 32, wherein the interface surface is at least a portion of at least one of:
- (a) object packaging;
 - (b) object labelling; and,
 - 25 (c) a surface of the object.
- 47) The method of any one of claims 1, 14, 23 and 32, wherein the coded data is disposed over at least one of:
- (a) substantially all of any one of:
 - (i) an entire object surface;
 - 30 (ii) packaging; and,
 - (iii) a object label;
 - (b) more than 25% of any one of:
 - (i) an entire object surface;
 - (ii) packaging; and,
 - 35 (iii) a object label;
 - (c) more than 50% of any one of:

- (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label;
- (d) more than 75% of any one of:
- 5
- (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label.